

CLAIMS

What is claimed is:

- 1 1. A method for performing operations in an electronic file system, the method
2 comprising the steps of:
3 receiving a command to perform one or more file system operations;
4 in response to said command, performing a plurality of operations including said one
5 or more file system operations;
6 wherein the step of performing the plurality of operations includes:
7 performing a first subset of said plurality of operations as part of a first
8 transaction; and
9 performing a second subset of said plurality of operations as part of a second
10 transaction that is nested in said first transaction.

- 1 2. The method of Claim 1 wherein the step of performing the plurality of
2 operations further includes the step of performing a third subset of said
3 plurality of operations as part of a third transaction that is nested in said
4 second transaction.

- 1 3. The method of Claim 1 wherein the second subset of operations are operations that
2 are triggered by an operation that belongs to said first subset of operations.

- 1 4. The method of Claim 1 wherein:
2 the step of receiving the command is performed by an entity that resides external to a
3 database server; and
4 the step of performing said plurality of operations includes said entity sending
5 database commands to said database server.

- 1 5. The method of Claim 4 wherein the step of performing said second subset includes:

2 the entity sending to the database server a savepoint command for the database server
3 to establish a savepoint; and
4 after the entity sends to the database server a savepoint command, the entity sending
5 to the database server commands for performing said second subset of said
6 plurality of operations.

1 6. The method of Claim 5 further comprising the entity responding to a failure of an
2 operation in said second subset by sending to the database server a command to roll
3 back to said savepoint.

1 7. The method of Claim 4 further comprising the entity maintaining a transaction list by
2 performing the steps of:
3 adding an entry to the tail of the transaction list when the entity sends a savepoint
4 command to the database server to start a nested transaction; and
5 when an operation fails, determining the savepoint to roll back to based on the entry
6 at the tail of the transaction list; and
7 removing the entry from the tail of the transaction list when the nested transaction
8 fails or completes successfully.

1 8. The method of Claim 3 wherein:
2 the one or more file system operations include an operation on a folder; and
3 the second subset of operations includes operations associated with one or more
4 documents within the folder.

1 9. The method of Claim 4 further comprising the steps of:
2 the entity determining whether all operations that are to be performed as a nested
3 transaction are read only;

4 if all operations that are to be performed as the nested transaction are read only, then
5 sending commands to perform the operations without first sending a command
6 to establish a savepoint; and
7 if all operations that are to be performed as the nested transaction are not read only,
8 then sending a command to establish a savepoint prior to sending commands
9 to perform the operations.

1 10. A computer-readable medium carrying instructions for performing operations in an
2 electronic file system, the computer-readable medium comprising instructions for
3 performing the steps of:

4 receiving a command to perform one or more file system operations;
5 in response to said command, performing a plurality of operations including said one
6 or more file system operations;

7 wherein the step of performing the plurality of operations includes:

8 performing a first subset of said plurality of operations as part of a first
9 transaction; and

10 performing a second subset of said plurality of operations as part of a second
11 transaction that is nested in said first transaction.

1 11. The computer-readable medium of Claim 10 wherein the step of
2 performing the plurality of operations further includes the step of
3 performing a third subset of said plurality of operations as part of a third
4 transaction that is nested in said second transaction.

1 12. The computer-readable medium of Claim 10 wherein the second subset of operations
2 are operations that are triggered by an operation that belongs to said first subset of
3 operations.

- 1 13. The computer-readable medium of Claim 10 wherein:
- 2 the step of receiving the command is performed by an entity that resides external to a
- 3 database server; and
- 4 the step of performing said plurality of operations includes said entity sending
- 5 database commands to said database server.
- 1 14. The computer-readable medium of Claim 13 wherein the step of performing said
- 2 second subset includes:
- 3 the entity sending to the database server a savepoint command for the database server
- 4 to establish a savepoint; and
- 5 after the entity sends to the database server a savepoint command, the entity sending
- 6 to the database server commands for performing said second subset of said
- 7 plurality of operations.
- 1 15. The computer-readable medium of Claim 14 wherein the entity responds to a failure
- 2 of an operation in said second subset by sending to the database server a command to
- 3 roll back to said savepoint.
- 1 16. The computer-readable medium of Claim 13 further comprising instructions for
- 2 causing the entity to maintain a transaction list by performing the steps of:
- 3 adding an entry to the tail of the transaction list when the entity sends a savepoint
- 4 command to the database server to start a nested transaction; and
- 5 when an operation fails, determining the savepoint to roll back to based on the entry
- 6 at the tail of the transaction list; and
- 7 removing the entry from the tail of the transaction list when the nested transaction
- 8 fails or completes successfully.
- 1 17. The computer-readable medium of Claim 12 wherein:

- 2 the one or more file system operations include an operation on a folder; and
3 the second subset of operations includes operations associated with one or more
4 documents within the folder.
- 1 18. The computer-readable medium of Claim 13 further comprising instructions for
2 performing the steps of:
3 the entity determining whether all operations that are to be performed as a nested
4 transaction are read only;
5 if all operations that are to be performed as the nested transaction are read only, then
6 sending commands to perform the operations without first sending a command
7 to establish a savepoint; and
8 if all operations that are to be performed as the nested transaction are not read only,
9 then sending a command to establish a savepoint prior to sending commands
10 to perform the operations.